

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

2. (Cancelled)

3. (Cancelled)

4. (Previously Amended) A semiconductor photo-detector, comprising:

an intrinsic or a first conduction type semiconductor layer, a photo-absorption layer comprising a superlattice semiconductor layer or a multiple quantum well semiconductor layer, and a schottky electrode are disposed on a substrate having a top surface and an end surface meeting at an edge;

said photo-absorption layer being spaced from said edge of said substrate adjoining said end surface;

a semiconductor multilayer structure of large schottky-barrier height having a schottky barrier higher in schottky barrier height than a schottky barrier between said photo-absorption layer and said schottky electrode is formed between said photo-absorption layer and said schottky electrode; and

a light incident facet on said end surface and forming an acute angle with said top surface, wherein incident light is refracted at said light incident facet and transits said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer.

5. (Original) The semiconductor photo-detector as claimed in claim 4, wherein said semiconductor layer of large schottky-barrier height comprises $\text{In}_{1-x-y}\text{Ga}_x\text{Al}_y\text{As}$ ($0 \leq x \leq 1$, $0 \leq y \leq 1$).

6. (Original) The semiconductor photo-detector as claimed in claim 4, wherein said semiconductor layer of large schottky-barrier height comprises $\text{In}_{1-x-y}\text{Ga}_x\text{Al}_y\text{As}$ ($0 \leq x \leq 1$, $0 \leq y \leq 1$) and thin $\text{In}_{1-u}\text{Ga}_u\text{As}_{1-v}\text{P}_v$ ($0 \leq u \leq 1$, $0 \leq v \leq 1$) disposed thereon.

7. (Previously Amended) The semiconductor photo-detector as claimed in claim 4, wherein a compositionally graded or step-graded layer from the same composition as said photo-absorption layer to the same composition as said semiconductor layer of large schottky-barrier height is disposed between said photo-absorption layer and said semiconductor layer of large schottky-barrier height.

8. (Previously Amended) A semiconductor photo-detector, comprising:
a substrate having a top surface and an end surface meeting at an edge;
a photo-absorption part comprising a semiconductor multilayer structure including a photo-absorption layer provided on said top surface of said substrate and spaced from said edge;
a light incident facet on said end surface and forming an acute angle with said top surface;
and
a V- or U-shaped groove opposed to said light incident facet,
wherein incident light from an optical fiber disposed in said groove is refracted at said light incident facet and transits said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer.

9. (Previously Amended) The semiconductor photo-detector as claimed in Claim 8, wherein said light incident facet and said V- or U-shaped groove are fabricated simultaneously by etching.

10. (Original) The semiconductor photo-detector as claimed in claim 8, wherein said light incident facet and the vicinity thereof are buried in an organic substance.

11. (Cancelled)

12. (Cancelled)

13. (Currently Amended) A semiconductor photo-detector, comprising:
a substrate having a top surface and an end surface meeting at an edge;
a photo-absorption part comprising a semiconductor multilayer structure including a photo-absorption layer provided on said top surface of said substrate;
a light incident facet on said end surface and forming an acute angle with said top surface;
and
said end surface including an abutting ~~portion extending from said substrate a specified lateral distance beyond said edge;~~ and surface positioned below and spaced laterally from said light incident facet and said edge for receiving an optical waveguide to contribute to precisely positioning said optical wave guide; and
wherein incident light from an said optical waveguide ~~precisely positioned by contacting against said abutting portion of said end surface is~~ being refracted at said light incident facet and ~~transits~~ transiting said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer when introduced to said light incident facet.

14. (Currently Amended) A semiconductor photo-detector, comprising:
a substrate having a top surface and an end surface meeting at an edge;
a photo-absorption part comprising a semiconductor multilayer structure including a photo-absorption layer provided on said top surface of said substrate;
a light incident facet on said end surface and forming an acute angle with said top surface;
and
an upper layer ~~of over~~ said photo-absorption layer ~~is in said photo-absorption part being~~ terminated with a substance having a smaller refractive index than a semiconductor layer,
wherein ~~light incident~~ incident light is refracted at said light incident facet and transits said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer such that said transit light is totally reflected by said smaller refractive index substance ~~of terminating~~ said upper layer ~~of said photo-absorption layer.~~

15. (Cancelled)

16. (Original) The semiconductor photo-detector as claimed in claim 5, wherein a compositionally graded or step-graded layer from the same composition as said photo-absorption layer to the same composition as said semiconductor layer of large schottky-barrier height is disposed between said photo-absorption layer and said semiconductor layer of large schottky-barrier height.

17. (Original) The semiconductor photo-detector as claimed in claim 6, wherein a compositionally graded or step-graded layer from the same composition as said photo-absorption layer to the same composition as said semiconductor layer of large schottky-barrier height is disposed between said photo-absorption layer and said semiconductor layer of large schottky-barrier height.